

Mapping for Silicon Run IIb

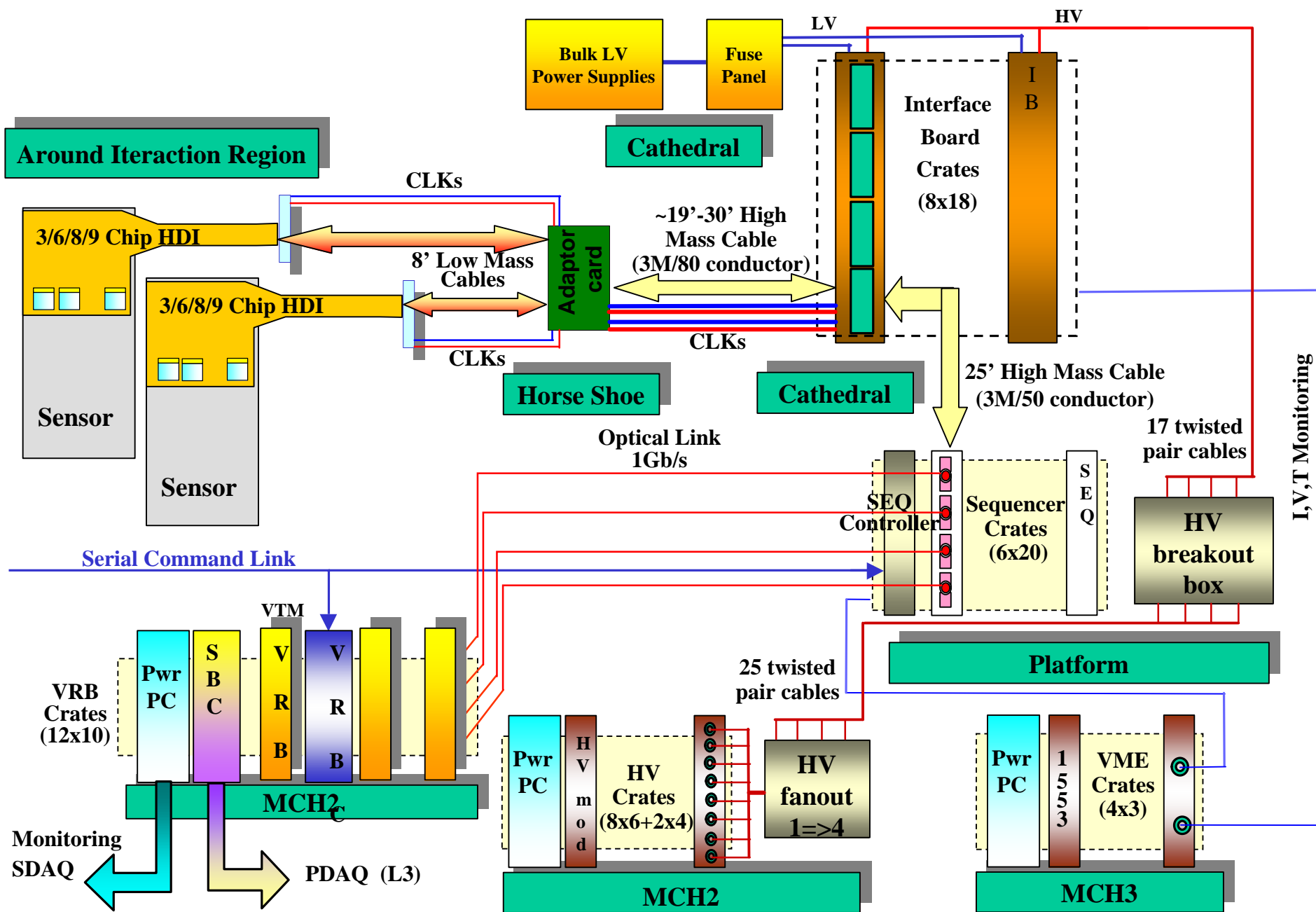
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<http://d0server1.fnal.gov/projects/run2b/Silicon/www/smt2b/readout/mapping.htm>

Mapping/Cabling Requirements

1. Do not move the 80 conductor cables
 2. Do not move the 50 conductor cables
 3. Avoid cable knots
 4. Each HV channel has channel from only one VRB
 5. Each stave goes into one VRB (soft constr.)
- 80-cond. cable requirements (from STT / see B.Reay's note)
1. Do not combine different stave types I,II,III,IV
 2. Do not combine hybrids from different 30deg. sectors
 3. Do not combine L0 with other layers
 4. Do not combine L4 with other layers
 5. Do not combine a layer with any other layer (soft constr.)



PowerPCs and Single Board Computers are accessed thru Ethernet

How many hybrids does it take to ...

Type	#channels
hybrid	1
stave	4
jumper cable	1
junction card	3
tw.Pair cable	1
adapter card	4
80-conductor cable	2
interface board	8
50-conductor cable	2
sequencer	8
sequencer fiber	2
VRB	8
HV channel	4



Lyn's Mapping Suggestion

1A												1B														
	I	III	I	I	III	III	II	IV	I			II	IV	III	II	IV	III	II	IV	III						
1	2	3	4	5	6	7	8	9	10	11		12	13	14	15	16	17	18	19	20	21					
	0-9	0-10	1-9	2-9	1-10	2-10	3-13	3-15	2-9			3-16	3-18	2-12	3-20	3-12	2-8	3-13	3-15	2-10						
	0-9	0-10	1-9	4-17	1-10	3-14	4-18	4-20	4-17			4-22	4-24	3-17	4-14	4-16	3-11	4-18	4-20	3-14						
	0-9	0-10		5-20		4-19	5-22	5-24	5-20			5-27	5-29	4-23	5-17	5-19	4-15	5-22	5-24	4-19						
				5-21		5-23			5-21					5-28			5-18			5-23						

1A												1B										SEQ7	
1	2	3	4	5	6	7	8	9	10	11		12	13	14	15	16	17	18	19	20	21		
												0-9	0-10	1-9	2-9	2-10	3-13	3-15	3-13	2-9	2-10		
												0-9	0-10	1-9	4-17	3-14	4-18	4-20	4-18	4-17	3-14		
												0-9	0-10	1-10	5-20	4-19	5-22	5-24	5-22	5-20	4-19		
														1-10	5-21	5-23	3-15	4-20	5-24	5-21	5-23		

M206-0																				
1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21

M207-0																				
1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21

M208-0																				
1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21

SOUTHWEST

INTERFACE

OA												TYPE									
I	I	III	I	I	III	III	II	IV	I			SLOT									
1	2	3	4	5	6	7	8	9	10												
	0-5	0-6	1-5	2-5	1-6	2-6	3-7	3-9	2-5												
	0-5	0-6	1-5	4-9	1-6	3-8	4-10	4-12	4-21												
	0-5	0-6		5-10		4-11	5-12	5-14	5-25												
				5-11		5-13			5-26												

SEQUENCER

OA																					
1	2	3	4	5	6	7	8	9	10												
	0-5	0-6	1-5	2-5	2-6	3-7	3-9	3-16	2-5												
	0-5	0-6	1-5	4-9	3-8	4-10	4-12	4-22	4-21												
	0-5	0-6	1-6	5-10	4-11	5-12	5-14	5-27	5-25												
			1-6	5-11	5-13	3-18	4-24	5-29	5-26												

VRB

M209-0																				
1	2	3	4	5	6	7	8	9	10											

VRB

M210-0																				
1	2	3	4	5	6	7	8	9	10											

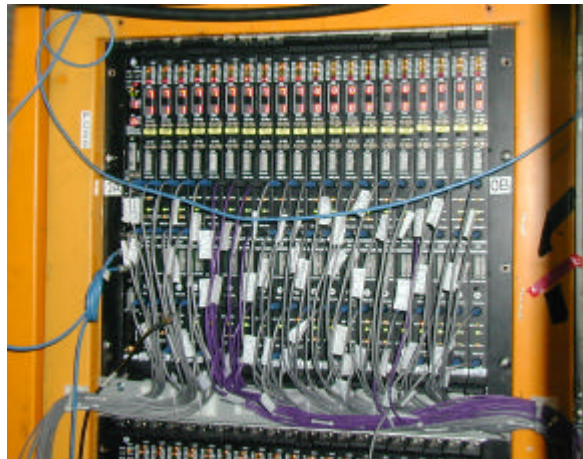
VRB

M211-0																				
1	2	3	4	5	6	7	8	9	10											

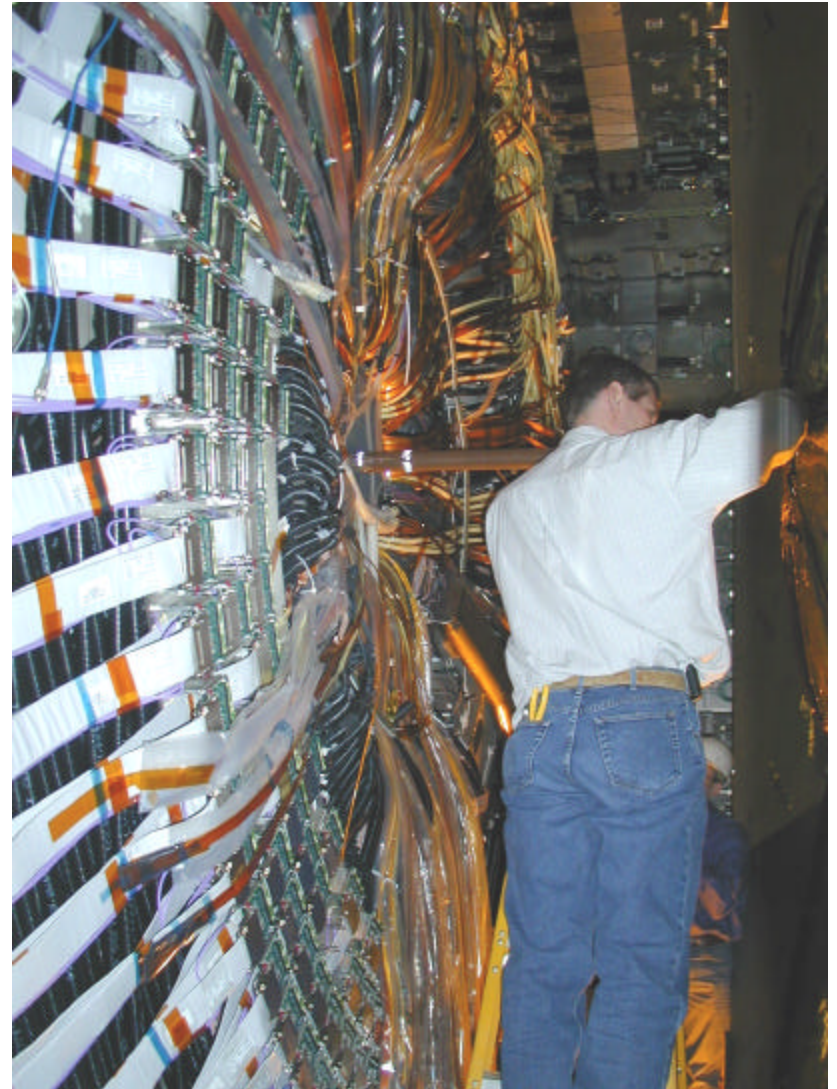
A Sector 3A 3E **S**

Readout Electronics

- Interface Boards
 - 8 crates (144 boards) located inside the detector volume
 - Regenerates signals
 - SVX monitoring and power management
 - Bias voltage distribution
- SEQuencers
 - 6 crates (120 boards) located on the detector platform
 - Use SVX control lines to actuate acquisition, digitization and readout
 - Convert SVX data to optical signals
- VRBs (Readout Buffers)
 - 12 crates (120 boards) located in counting house
 - Data buffer pending L2 trigger decision
 - Input @ 5-10 kHz L1 accept rate ~ 50 Mb/s/channel
 - Output @ 1 kHz L2 accept rate ~ 50 Mb/s

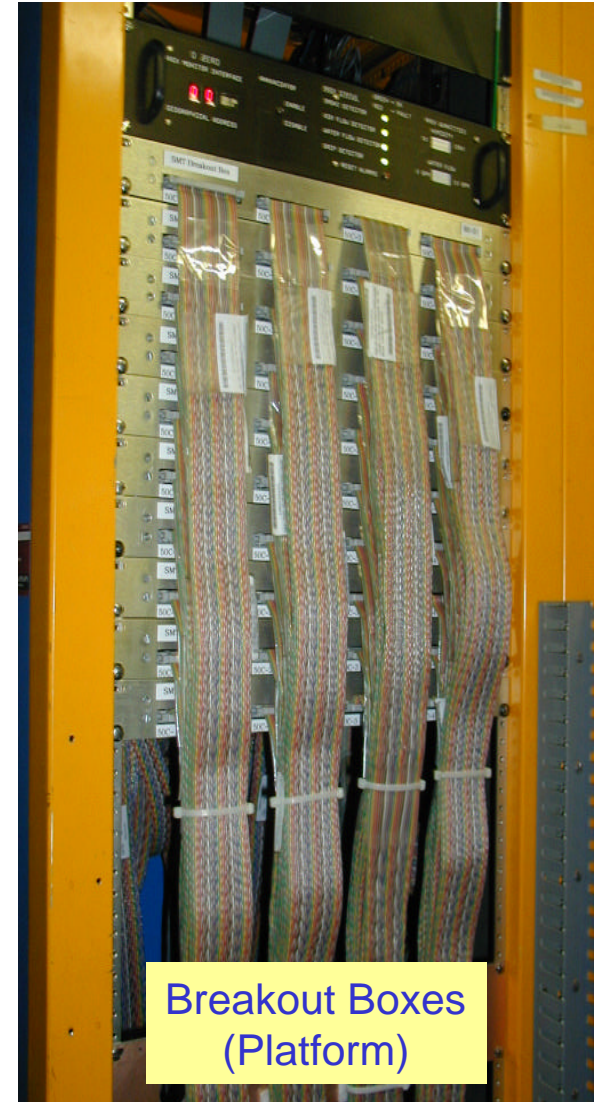
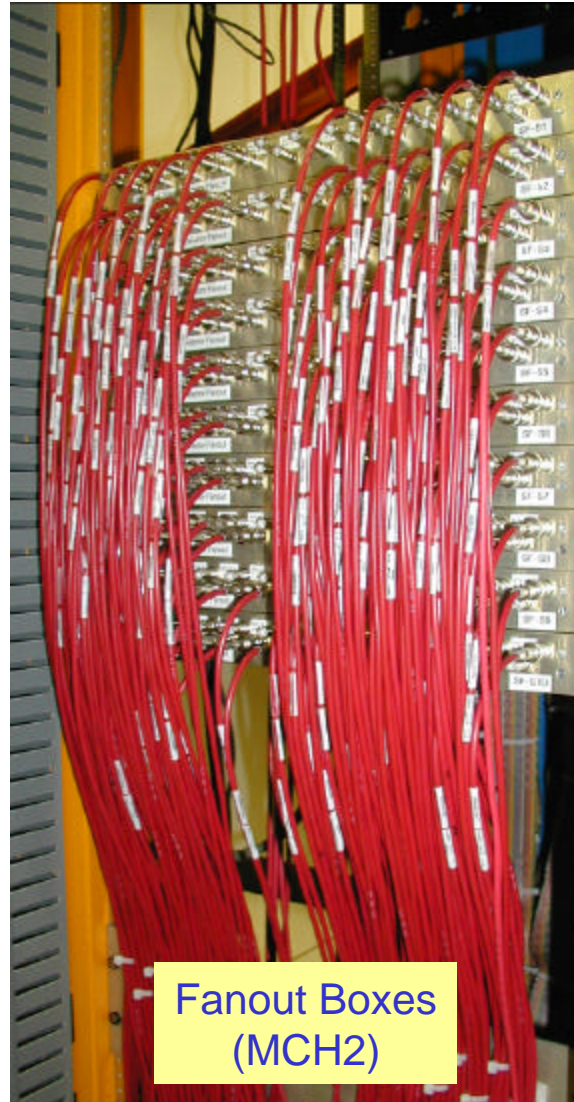


Installation



Interface Boards

HV distribution



Naming of Installed Parts

A few technical terms

- Module:** A sensor/hybrid combo in Layers L2-5
Types: 10/10A 20/20A 10/10S 20/20S
- Stave:** 10/10A+20/20A+10/10S+20/20S+support
- Ladder:** Sensors ganged together in readout
(1 Module = 2 Ladders)

General Remarks

- Labeling of production parts and installed parts differs
- **Worst case naming scenario:** Each subgroup uses different names for the same installed object: HV naming different from DAQ naming different from reconstruction different from MC simulation ...
- It might be convenient to have a scheme similar to RunIIa
 - Because it is convenient not to have to learn new names
- It might be better **NOT** to have a scheme similar to RunIIa
 - Because the detector geometry is very different and the naming should reflect the geometry.
- The proposed scheme is a good compromise of these two principles

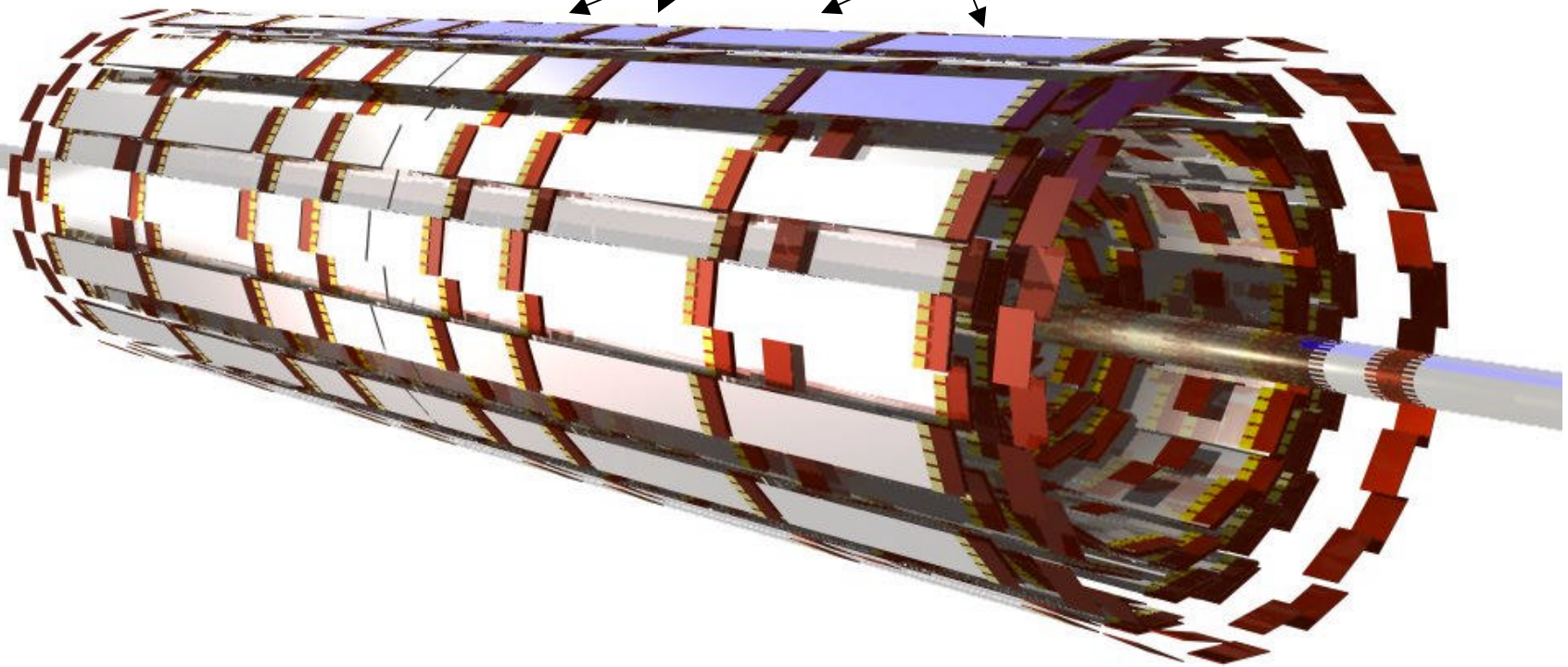
Module Position on Stave

North End

South End

10/10

20/20

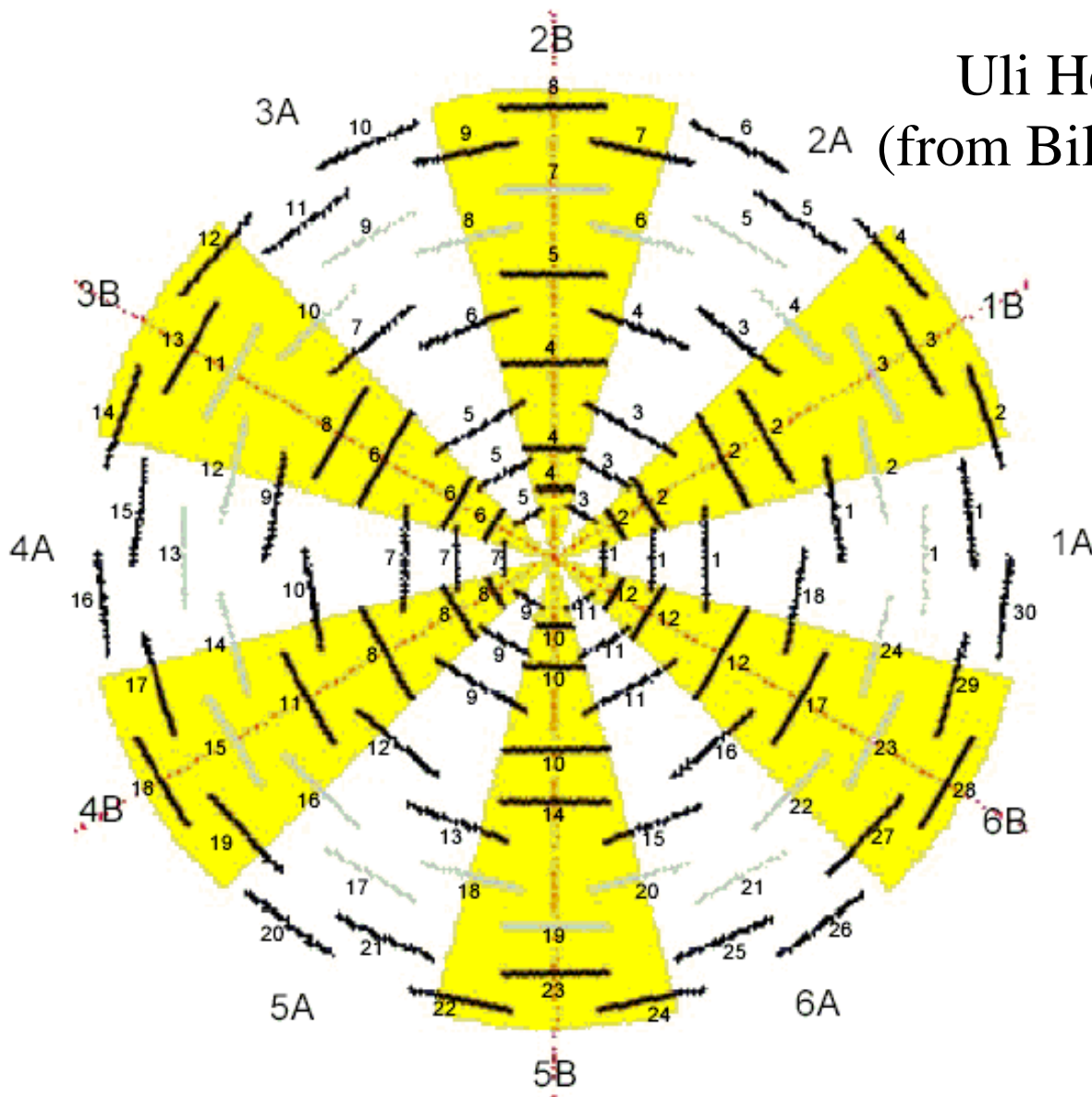


Naming of ladders:
Lisa will use “barrel” label

Stave Location in R-phi

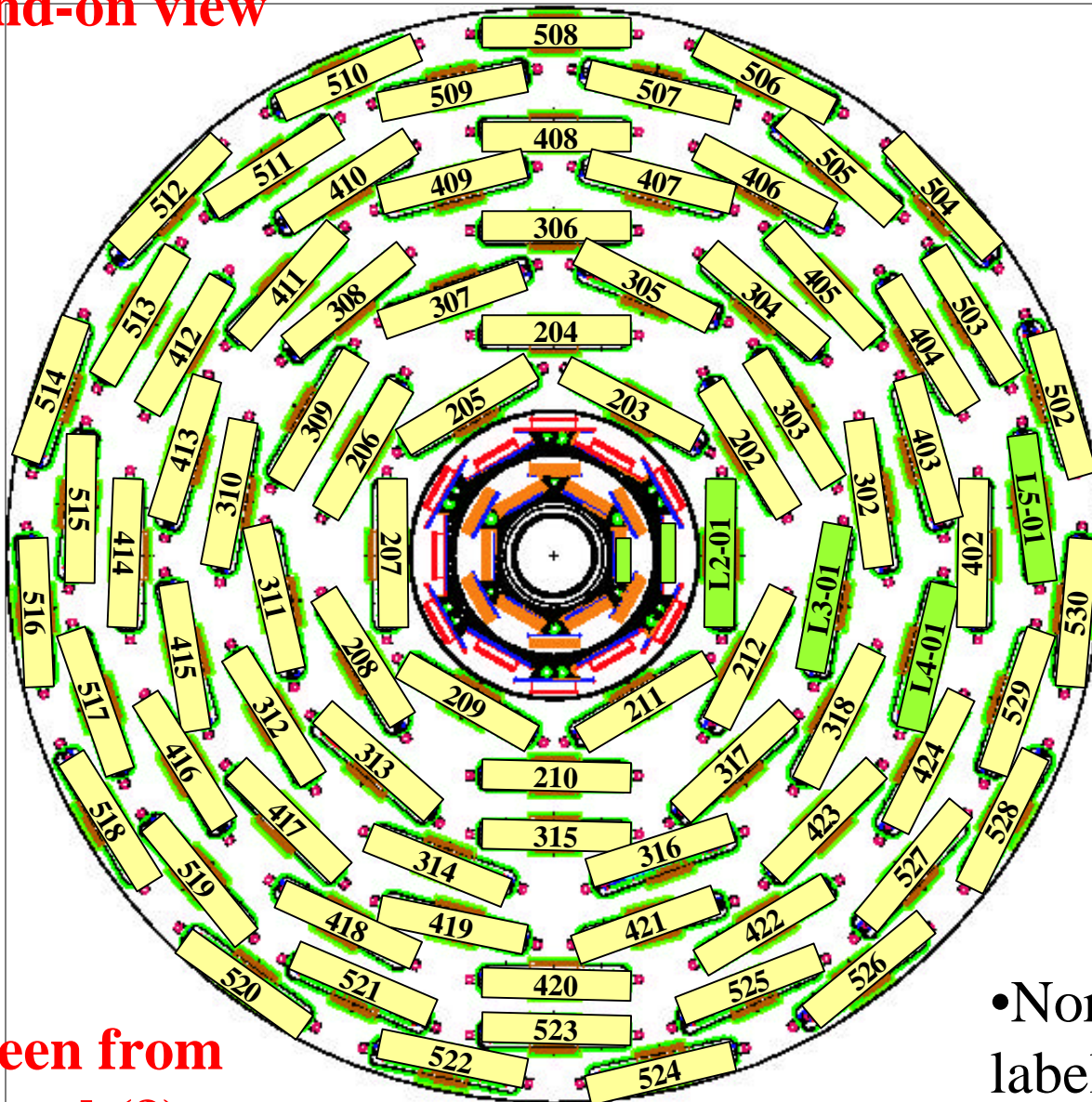
Uli Heintz's STT labeling
(from Bill Reay's mapping note)

No inner/outer radius
stave structure



Stave Location in R-phi

End-on view



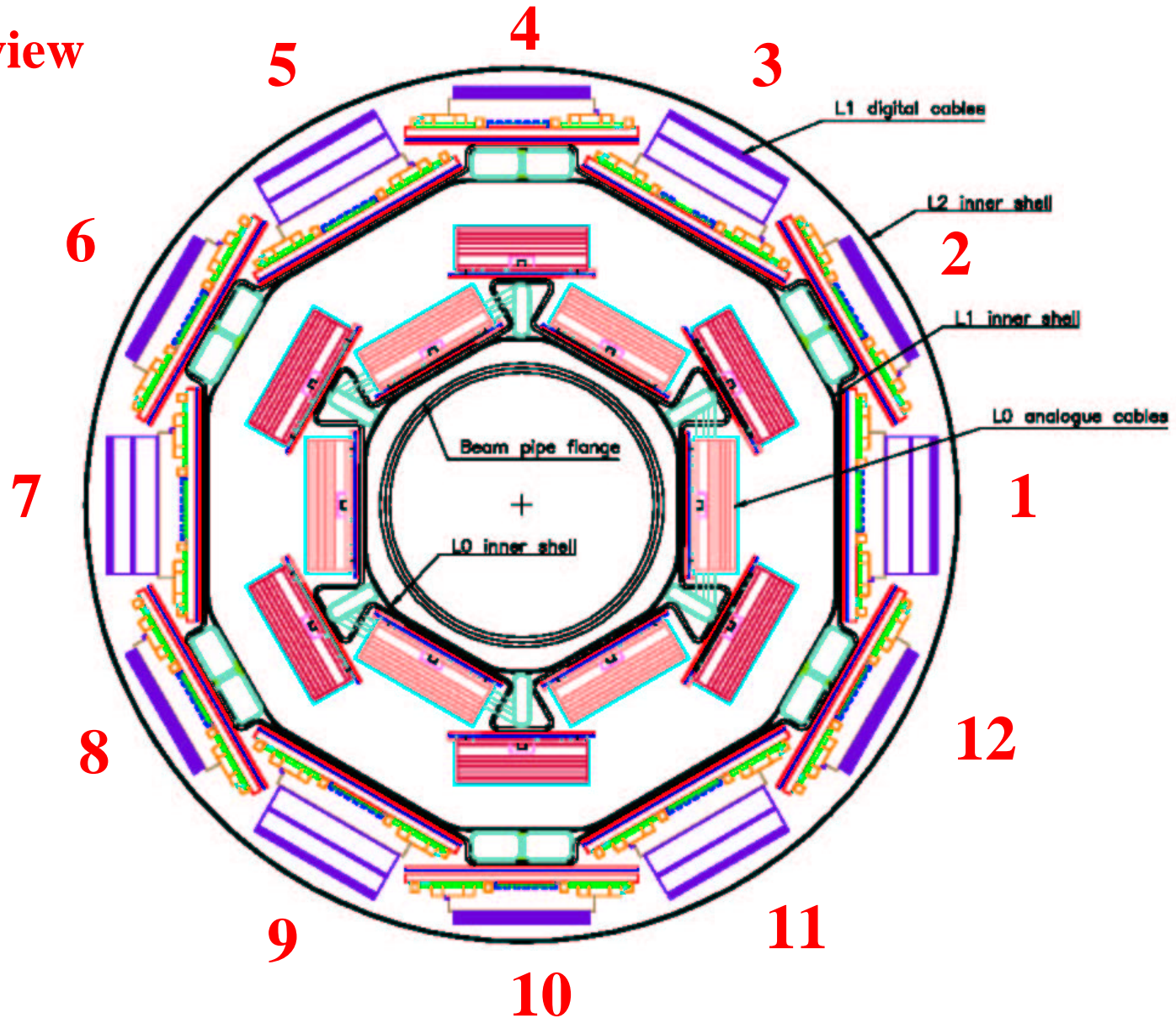
- Compromise between STT note and reconstruction needs
- Label with 3 digits
- highest significant digit indicates layer
- Start at x-axis, similar to U.Heinz's STT note)
- Go counterclockwise
- Odd numbers have always smaller radius than even numbers in the same layer, consistent with Table 9, TDR

• North/South, Axial/Stereo labels: AN, AS, SS, SN

Seen from
South(?)

Naming of Layer 0 and 1

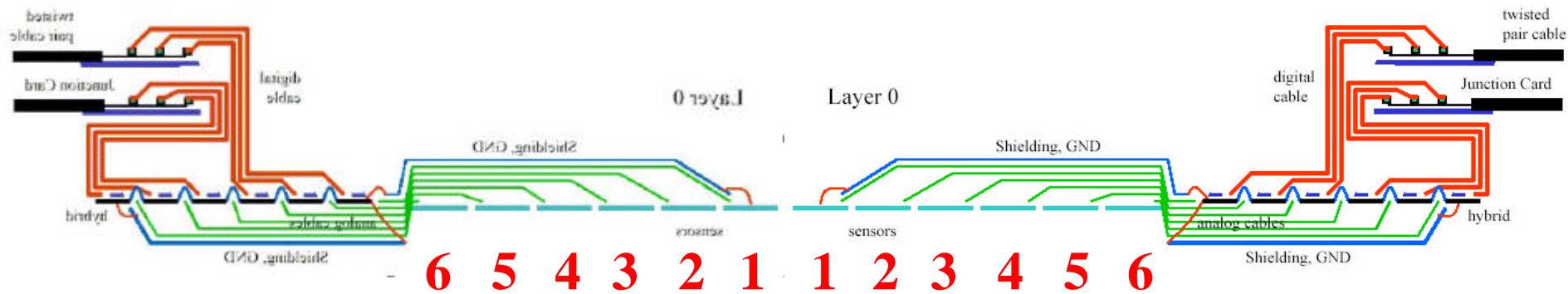
End-on view



Naming of Layer 0 and 1 Sensors

South End

North End



Naming of Module/Staves – Part2

- How to address a sensor located inside the run IIb detector?
- Use stave number and local sensor number

L3-08NA-6

- It is in layer 3, North side, Axial alignment
- in an outer radius stave (because of even stave number)
- the 6th sensor from the middle of the detector => outermost sensor on the north side
- Advantage: Everybody is able to find it using the map
- Hybrid locations are labeled by module

Naming of Production Parts

Naming of Production Parts, Hybrids

- Name of Production parts conveys part properties.
- Hybrid properties to appear in naming:
 - Layer 0 / L1 / L2-5 Axial / L2-5 Stereo
- I suggest to label production hybrids with a 4-digit number, following a suggestion by Jim Fast
- Highest significant number could indicate the hybrid type

Label	Hybrid
0	L0
1	L1
2	L2-5 Axial
3	L2-5 Stereo

Highest
Significant
Digit ↑

Example:

Hybrid-0001 Layer0

Hybrid-1001 Layer1

Hybrid-2001A Layer2-5 Axial

Hybrid-3001S Layer2-5 Stereo

How does the database handle preceding 0's ?

Does the database accept hyphens?


How do we handle pre-production parts?

Naming of Production Parts, Sensors

- Layer 0 / L1 / L2-5
- production sensors with a 4-digit number
- The highest significant number indicates the sensor type

Label	Sensor
0	L0
1	L1
2,3	L2-5

Highest
Significant
Digit



Naming of Production Parts, Modules

- L2-5 Modules named after hybrid they contain
+ appendix to indicate 10/10 and 20/20 Modules
Hyb-2001A (L2-5, axial hybrid) becomes either
 - M-2001-10/10A or
 - M-2001-20/20A

Naming of junction cards/adaptor cards

- No differentiation by layer
- Assign consecutive production numbers

Naming of L0 flex cables

- Assign production numbers based on layer and length -> will talk to Noel

Naming of jumper cables

- Differentiation by length

Naming of twisted pair cables

- Consecutive production numbers

Naming of Production Parts, Staves

- Are all staves alike? Yes!
- We can label staves with consecutive production numbers: Stave-1, Stave-2, Stave-3, ... Stave-199 ...
- Once the staves are installed, they receive numbers that indicate their location. Location numbers and production numbers will be different and can be mapped onto each other using the database.
- The map can be put into excel and posted on the web.
- That way everybody will know where his/her favorite stave/hybrid/sensor ended up. This knowledge is important for the operation of the detector.